

# *Gulf Cooperation Council*

## EDICT OF GOVERNMENT

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GSO 65 (1987) (English): INDUSTRIAL SAFETY AND  
HEALTH REGULATIONS - HAZARDOUS MATERIALS - FLAMMABLE  
AND COMBUSTIBLE LIQUIDS - PART 4: SERVICE STATIONS,  
PROCESSING PLANTS, REFINERIES AND CHEMICAL PLANTS



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STANDARDIZATION ORGANIZATION FOR G.C.C (GSO)



GSO 65/1987

اشتراطات السلامة والصحة الصناعية  
المواد الخطرة – السوائل القابلة للاشتعال  
الجزء الرابع :

محطات الخدمة والمصانع والمصافي والمعامل الكيميائية  
**INDUSTRIAL SAFETY AND HEALTH REGULATIONS –  
HAZARDOUS MATERIALS - FLAMMABLE AND  
COMBUSTIBLE LIQUIDS – PART 4:  
SERVICE STATIONS, PROCESSING PLANTS,  
REFINERIES AND CHEMICAL PLANTS**

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**INDUSTRIAL SAFETY AND HEALTH REGULATIONS –  
HAZARDOUS MATERIALS - FLAMMABLE AND  
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**INDUSTRIAL SAFETY AND HEALTH REGULATIONS –  
HAZARDOUS MATERIALS - FLAMMABLE AND  
COMBUSTIBLE LIQUIDS PART 4  
SERVICE STATIONS, PROCESSING PLANTS,  
REFINERIES AND CHEMICAL PLANTS**

**1. SCOPE AND FIELD OF APPLICATION**

This Standard is concerned with service stations where the flammable liquids are handled in dispensing and washing processes and in all other processes, where liquids are stored in closed containers not exceeding 0.23 m<sup>3</sup> capacity, in tanks located underground or in aboveground tanks. Also this standard is applied to those plants or buildings which contain chemical operations such as oxidation, reduction, halogenation, hydrogenation, alkylation, polymerization, and other chemical processes. It also applies to chemical plants, refineries or distilleries.

**2. COMPLEMENTARY REFERENCES**

- 2.1 GSO 218/1994 “Industrial Safety and Health Regulations – Part 7: Electrical – Low Voltage”.
- 2.2 GSO 62/1987 “Industrial Safety and Health Regulations - Hazardous Materials - Flammable and Combustible Liquids - Part 1: Tanks, Piping and Accessories”.
- 2.3 GSO 63/1987 “Industrial Safety and Health Regulations - Hazardous Materials - Flammable and Combustible Liquids - Part 2: Container and Portable Tank Storage”.
- 2.4 GSO 64/1987 “Industrial Safety and Health Regulations - Hazardous Materials . Flammable and Combustible Liquids - Part 3: Industrial and Bulk Plants”.
- 2.5 GSO 208/1994 “Industrial Safety and Health Regulations – Part 2: Buildings - Fire Protection”.

**3. DEFINITIONS**

- 3.1 Boiling Point: The boiling point of a liquid at a pressure of 101.3 kPa.
- 3.2 Boilover: Expulsion of crude oil (or certain other liquids) from a burning tank. The light fractions of the crude oil burnoff producing a heat wave in the residue, which on reaching a water strata may result in the expulsion of a portion of the contents of the tank in the form of froth.

- 3.3 Chemical Plant: A large integrated plant or that portion of such a plant other than a refinery or distillery where flammable or combustible liquids are produced by chemical reactions or used in chemical reactions.
- 3.4 Crude Petroleum: Hydrocarbon mixtures that have a flash point below 65°C and which have not been processed in a refinery.
- 3.5 Fire Area: An area of a building separated from the remainder of the building by a construction having a fire resistance of at least one hour and having all communicating openings properly protected by an assembly having a fire resistance rating of at least one hour.
- 3.6 Refinery: Plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources.
- 3.7 Vapour Pressure: Pressure exerted by a vapour that is in equilibrium with its liquid form at its free surface.
- 3.8 Viscous: A viscosity 6.0 centistokes or more.

#### 4. REGULATIONS

##### 4.1 Service Stations

##### 4.1.1 Storage and Handling

- 4.1.1.1 Liquids shall be stored in approved closed containers not exceeding 0.23 cu. m capacity, in tanks located underground, in tanks in special enclosures as described in item 4.1.1.6, or in above-ground tanks as provided for in the Gulf Standard mentioned in item 2.2. Aboveground tanks, located in an adjoining bulk plant may be connected by piping to service station underground tanks if, in addition to valves at aboveground tanks, a valve is also installed within control of service station personnel.
- 4.1.1.2 Apparatus dispensing Class 1 liquids into the fuel tanks of motor vehicles of the public shall not be located at a bulk plant unless separated by a fence or similar barrier from the area in which bulk operations are conducted.
- 4.1.1.3 The provisions of item 4.1.1.1 shall not prohibit the dispensing of flammable liquids in the open from a tank vehicle to a motor vehicle. Such dispensing shall be permitted provided that:
- The dispensing is done on premises not open to the public.
  - The dispensing hose does not exceed 15 m in length.
  - The dispensing nozzle is a listed automatic-closing type without a latch-open device.
- 4.1.1.4 Class 1 and 2 liquids shall not be stored or handled within a building having a basement or pit into which flammable vapours may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapours therein.

- 4.1.1.5 Accurate inventory records shall be maintained and reconciled on all Class 1 and 2 liquid storage tanks for possible indication of leakage from tanks or piping.
- 4.1.1.6 Any enclosure shall be substantially liquid and vapourtight without backfill. Sides, top, and bottom of the enclosure shall be of reinforced concrete at least 15 cm thick, with openings for inspection through the top only. Tank connections shall be so piped or closed that neither vapours nor liquid can escape into the enclosed space. Means shall be provided whereby portable equipment may be employed to safely discharge to the outside any liquid or vapours which might accumulate should leakage occur.
- 4.1.1.7 Except where stored in tanks as provided in item 4.1.1.6, no Class 1 or 2 liquids shall be stored within any service station building except in closed containers of aggregate capacity not exceeding 230 litres. One container not exceeding 230 litres capacity equipped with an approved pump is permitted.
- 4.1.1.8 Class 1 and 2 liquids may be transferred from one container to another in lubrication or service rooms of a service station building provided that the electrical installation complies with Table 1 and provided that any heating equipment complies with item 4.1.4.
- 4.1.1.9 Class 3 liquids may be stored and dispensed inside service station buildings from tanks of not more than 460 litres capacity each.
- 4.1.1.10 No delivery of any Class 1 liquids shall be made into portable container unless the container is constructed of metal, has a tight closure with screwed or spring cover, and is fitted with a spout or so designed that the contents can be poured without spilling.
- 4.1.2 Dispensing System
  - 4.1.2.1 Dispensing devices at automotive service stations shall be so located that all parts of the vehicle being serviced will be on the premises of the service station.
  - 4.1.2.2 Approved dispensing units may be located inside buildings. The dispensing area shall be separated from other areas. The dispensing unit and its piping shall be mounted either on a concrete island or protected against collision damage and shall be located in a position where it cannot be struck by a vehicle descending a ramp or other slope out of control. The dispensing area shall be provided with a ventilation system. When dispensing units are located below grade, only mechanical ventilation shall be used and the entire dispensing area shall be protected by an automatic sprinkler system. Ventilating systems shall be electrically interlocked with gasoline dispensing units so that the dispensing units cannot be operated unless the ventilating fan motors are energized.
  - 4.1.2.3 Clearly identified and easily accessible switch(es) or a circuit breaker(s) shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency.



- 4.1.2.4 Class 1 and 2 liquids shall be transferred from tanks by means of fixed pumps so designed and equipped as to allow control of the flow and to prevent leakage or accidental discharge, Only approved devices may be used for dispensing Class 1 and 2 liquids. No such device may be used if it shows evidence of having been dismantled.
- 4.1.2.4.1 Every dispensing device for Class 1 and 2 liquids shall contain evidence of approval so placed that any attempt to dismantle the device will result in damage to such evidence, visible without disassembling or dismounting of the nozzle.
- 4.1.2.4.2 Class 1 and 2 liquids shall not be dispensed by pressure from drums, barrels, and similar containers. Approved pumps taking suction through the top of the container or approved self-closing faucets shall be used.
- 4.1.2.4.3 The dispensing units, except those attached to containers, shall be mounted either on a concrete island or protected against collision damage.
- 4.1.2.5 This item shall apply to systems for dispensing Class 1 and 2 liquids where such liquids are transferred from storage to individual or multiple dispensing units by pumps located elsewhere other than at the dispensing units.
- 4.1.2.5.1 Pumps shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure. Pumps installed above ground, outside buildings shall be located not less than 3 m from lines of adjoining property which may be built upon, and not less than 1.5 m from any building opening. When an outside pump location is impractical, pumps may be installed inside buildings as provided for dispensers in item 4.1.2.2 or in pits as provided below. Pumps shall be substantially anchored and protected against physical damage by vehicles. The pit shall be no larger than necessary for inspection and maintenance and shall be provided with a fitted cover.
- 4.1.2.5.2 A control shall be provided that will permit the pump to operate only when a dispensing nozzle is removed from its bracket on the dispensing unit and the switch on this dispensing unit is manually actuated. This control shall also stop the pump when all nozzles have been returned to their brackets.
- 4.1.2.5.3 An approved impact valve, incorporating a fusible link, designed to close automatically in the event of severe impact or fire exposure shall be properly installed in the dispensing supply line at the base of each individual dispensing device.
- 4.1.2.5.4 After the completion of the installation, including any paving, that section of the pressure piping system between the pump discharge and the connection for the dispensing facility shall be tested for at least 30 minutes at the maximum operating pressure of the system. Such tests shall be repeated at 2 year intervals thereafter.
- 4.1.2.5.5 Hose-nozzle valves of either the manual or automatic-closing type for dispensing Class 1 and 2 liquids into a fuel tank or into a container shall be manually held open during the dispensing operation.
- 4.1.3 Electrical Equipment

- 4.1.3.1 This item shall apply to areas where Class 1 or 2 liquids are stored or handled. For areas where Class 3 liquids are stored or handled the electrical equipment may be installed in accordance with the Gulf Standard mentioned in item 2.1 for ordinary locations.
- 4.1.3.2 All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with the Gulf Standard mentioned in item 2. 1.
- 4.1.3.3 So far as it applies, Table 1 shall be used to delineate and classify hazardous areas for the purpose of installation of electrical equipment under normal circumstances. A classified area shall not extend beyond an unpierced wall, roof, or other solid partition.
- 4.1.3.4 The area classifications listed shall be based on assurance that the installation meets the applicable requirements of this item in all respects.
- 4.1.4 Heating Equipment
  - 4.1.4.1 Heating equipment shall be installed in the conventional manner in an area except as provided below.
  - 4.1.4.2 Heating equipment may be installed in a special room separated from an area classified by Table 1 by walls having a fire resistance rating of at least one hour and without any openings in the walls within 2.4 m of the floor into an area classified in Table 1. This room shall not be used for combustible storage and all air for combustion purposes shall come from outside the building.
  - 4.1.4.3 Heating equipment using gas or oil fuel may be installed in the lubrication, sales or service room where there is no dispensing or transferring of Class 1 or 2 liquids provided the bottom of the combustion chamber is at least 46 cm above the floor and the heating equipment is protected from physical damage by vehicles. Heating equipment using gas or oil fuel listed for use in garages may be installed in the lubrication or service room where Class 1 or 2 liquids are dispensed provided the equipment is installed at least 2.4 m above the floor.
  - 4.1.4.4 Electrical heating equipment shall conform to item 4.1.3.
  - 4.1.4.5 Provision shall be made in the area where Class 1 and 2 liquids are dispensed to prevent spilled liquids from flowing into the interior of service station buildings. Such provision may be by grading driveways, raising door sills, or other equally effective means. Crankcase drainings and flammable or combustible liquids shall not be dumped into sewers but shall be stored in tanks or drums outside buildings until removed from the premises-
  - 4.1.4.6 In addition to the previous restrictions of this item, the following shall apply: there shall be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids. Conspicuous and legible signs prohibiting smoking shall be posted within sight of the customer being served. The motors of all equipment being fueled shall be shut off during the fueling operation.
  - 4.1.4.7 Each service station shall be provided with at least one fire extinguisher having a minimum approved B-C classification located so that an extinguisher will be within 23 m of each pump, dispenser, underground fill pipe opening, and lubrication or service room.

**Table 1**  
**Electrical Equipment Hazardous Areas – Service Stations**

<b>Location</b>	<b>Class 1 Class D Division</b>	<b>Extent of Classified Area</b>
Underground Tank: Fill Opening	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
	2	Up to 46 cm above grade level within a horizontal radius of 3 m from a tight fill connection.
Vent-Discharging Upward	1	Within 1 m of open end of vent, extending in all directions.
	2	Area between 1 m and 1.5 m of open end of vent, extending in all directions.
Dispenser: Pits	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
Dispenser Enclosure	1	The area 1.2 m vertically above base within the enclosure and 46 cm horizontally in all directions.
Outdoor	2	Up to 46 cm above grade level within 6.1 m horizontally of any edge of enclosure.
Indoor: With Mechanical Ventilation	2	Up to 46 cm above grade or floor level within 6.1 m horizontally of any edge of enclosure.

Table 1 (Continued)

With Natural Ventilation	2	Up to 46 cm above grade or floor level within 7.6 m horizontally of any edge of enclosure.
Remote Pump-Outdoor	1	Any pit, box or space below grade level if any part is within a horizontal distance of 3 m from any edge of pump.
	2	Within 46 cm of any edge of pump, extending in all directions. Also up to 46 cm above grade level within 3 m horizontally from any edge of pump.
Remote Pump-Indoor	1	Entire area within any pit.
	2	Within 1.5 m of any edge of pump, extending in all directions. Also up to 1 m above floor or grade level within 7.6m horizontally from any edge of pump.
Lubrication or Service Room	1	Entire area within any pit.
	2	Area up to 46 cm above floor or grade level within entire lubrication room.
Dispenser for Class 1 Liquids	2	Within 46 cm of any fill of dispensing point, extending in all directions.
Special enclosure inside building according to the Gulf Standard mentioned in item 2.4.	1	Entire enclosure
Sales, Storage and Rest Rooms	Ordinary	If there is any opening to these rooms within the extent of a Division 1 area, the entire room shall be classified as Division 1.

**4.2 Processing Plants****4.2.1 Processing Building**

4.2.1.1 Processing buildings shall be of fire-resistant or noncombustible construction, except heavy timber construction with load-bearing walls may be permitted for plants utilizing only stable Class 3 liquids. Except in the case of explosion resistant walls used in conjunction with explosion relieving facilities, see item 4.2.2.4 load-bearing walls are prohibited. Buildings shall be without basements or covered pits.

4.2.1.2 Emergency drainage systems shall be provided to direct flammable or combustible liquid leakage and fire protection water to a safe location. Emergency drainage systems shall not be connected to public sewers or discharged into public waterways.

4.2.1.3 Enclosed processing buildings shall be ventilated. Equipment used in a building and the ventilation of the building shall be in accordance with the Gulf Standard mentioned in item 2.4.

**4.2.1.4 Explosion Relief**

Areas where Class 1, Class 2 or unstable liquids are processed shall have explosion venting through one or more of the following methods:

Open air construction.

Lightweight walls and roof.

Lightweight wall panels and roof hatches.

Windows of explosion venting type.

**4.2.2 Liquid Handling**

4.2.2.1 The storage of flammable or combustible liquids in tanks shall be in accordance with the Gulf Standard mentioned in item 2.2. If the storage of flammable or combustible liquids in outside above-ground or underground tanks is not practical because of temperature or production considerations, tanks may be permitted inside buildings or structures in accordance with the Gulf Standard mentioned in item 2.2.

4.2.2.2 Storage tanks inside buildings shall be permitted only in areas at or above ground which have adequate drainage and are separated from the processing area by construction having a fire resistance rating of at least two hours.

4.2.2.3 The storage of flammable or combustible liquids in containers shall be in accordance with the Gulf Standard mentioned in item 2.3.

4.2.2.4 Piping, valves, and fittings shall be in accordance with the Gulf Standard mentioned in item 2.2.

4.2.2.4.1 Approved flexible connectors may be used where vibration exists or where frequent movement is necessary. Approved hose may be used at transfer stations.

4.2.2.4.2 Piping containing flammable or combustible liquids shall be identified.

- 4.2.2.5 The transfer of large quantities of flammable or combustible liquids shall be through piping by means of pumps or water displacement.
- Except as required in process equipment, gravity flow shall not be used. The use of compressed air as a transferring medium is prohibited. Positive displacement pumps shall be provided with pressure relief discharging back to the tank or to pump suction.
- 4.2.2.6 Equipment shall be designed and arranged to prevent the unintentional escape of liquids and vapours.
- Where the vapour space of equipment is usually within the flammable range, the probability of explosion damage to the equipment can be limited by inerting, by providing an explosion suppression system, or by designing the equipment to contain the peak explosion pressure which may be modified by explosion relief. Where the hazards of operation, sources of ignition, or exposure indicate a need, protection shall be provided by one or more of the above means.
- 4.2.3 Tank Vehicle and Tank Car Loading and Unloading
- Tank vehicle and tank car loading or unloading facilities shall comply with the Gulf Standard mentioned in item 2.4.
- 4.2.4 Fire Control
- 4.2.4.1 Approved portable fire extinguishers of type and number shall be provided. (See Gulf Standard mentioned in item 2.5).
- 4.2.4.2 Where the hazards of operation or exposure indicate a need, the following fire control provision shall be provided.
- 4.2.4.2.1 Hydrants.
- 4.2.4.2.2 Hose connected to a source of water shall be installed so that all vessels, pumps, and other equipment containing flammable or combustible liquids can be reached with at least one hose stream. Nozzles that are capable of discharging a water spray shall be provided.
- 4.2.4.2.3 Processing plants shall be protected by an automatic sprinkler system or an equivalent extinguishing system. If special extinguishing systems including but not limited to those employing foam, carbon dioxide, or dry chemical are provided, approved equipment shall be used and installed.
- 4.2.4.3 A means for prompt notification of fire to those within the plant and any public fire department available shall be provided. It may be advisable to connect the plant system with the public system where public fire alarm system is available.
- 4.2.5 Sources of Ignition
- The Gulf Standard mentioned in item 2.4 shall apply.
- 4.2.5.1 Maintenance and Repair
- 4.2.5.1.1 When necessary to do maintenance work in a flammable or combustible liquid processing area, the work shall be authorized by a responsible representative of the employer.

- 4.2.5.1.2 Hot works, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of an individual in charge who shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.
- 4.2.5.2 All electrical wiring and equipment within storage or processing areas shall be installed in accordance with the Gulf Standards mentioned in item 2.1 and 2.4.
- 4.2.6 The Gulf Standard mentioned in item 2.4 shall apply for processing plants.
- 4.3 **Refineries, Chemical Plants, and Distilleries**
  - 4.3.1 Flammable or combustible liquids shall be stored in tanks, containers, or in portable tanks. Tanks shall be installed in accordance with the Gulf Standard mentioned in item 2.2.
  - 4.3.2 Wharves handling flammable or combustible liquids shall be in accordance with the Gulf Standard mentioned in item 2.4.
  - 4.3.3 Process units shall be located so that they are accessible from at least one side for the purpose of fire control. Where topographical conditions are such that flammable or combustible liquids may flow from a processing area so as to constitute a fire hazard to property of others, provision shall be made to divert or impound the flow by curbs, drains, or other suitable means.
  - 4.3.4 Fire extinguishing equipment provided shall be in accordance with applicable parts of item 4.2.4.